CLAIMS

What is claimed is:

1. A system for singularly controlling individual microscopic optical structures of a microelectromechanical optical device with individual pixel values generated by a pixel value source for substantially simultaneous application to the individual microscopic optical structures, comprising:

a) a multiplexing circuit, configured to accept a plurality of individual pixel values from the pixel value source and generate a multiplexed pixel stream;

b) an interconnect, coupled to the multiplexing circuit and configured for accepting the multiplexed pixel stream; and

c) a demultiplexing circuit, coupled to the interconnect and configured to receive the multiplexed pixel stream and extract the individual pixel values from the single stream to produce extracted pixel values for substantially simultaneous application to the individual microscopic optical structures according to a defined mapping of pixel values to individual microscopic optical structures.

2. The system of claim 1, further comprising a controller, communicating with said at least one demultiplexing circuit, said controller configured to vary the defined mapping of individual pixel values to individual microscopic optical structures.

3. The system of claim 1, wherein the microelectromechanical optical device is a grating light valve and the individual microscopic optical structures are ribbons of the grating light valve.

4. A microscopic optical structure controller for providing singular control of individual microscopic optical structures of a microelectromechanical optical device by a multiplexed stream of individual pixel values generated by a pixel value source, comprising:

a) at least one interconnect coupled to the pixel value source and configured for receiving the multiplexed stream of individual pixel values; and

b) at least one mapper communicating with said at least one interconnect, said mapper communicating with the individual microscopic optical structures, said mapper configured to extract individual pixel values from the multiplexed stream of individual pixel values to produce extracted individual pixel values, and said mapper configured to apply the extracted individual pixel values substantially simultaneously to one or more individual microscopic optical structures according to a configurable mapping.

5. The microscopic optical structure controller of claim 4, wherein said microscopic optical structure controller is configured to communicate with only a portion of the microscopic optical structures of the microelectromechanical optical device.

6. A microscopic optical structure controller for providing singular control of individual microscopic optical structures of a microelectromechanical optical device by a multiplexed stream of individual pixel values, comprising a plurality of sample and holds, each of said sample and holds in communication with an individual microscopic optical structure where each one of said sample and holds samples the multiplexed stream of individual pixel values at the time corresponding to the individual pixel value corresponding to the individual microscopic optical structure.

7. The microscopic optical structure controller of claim 6, further comprising a controller communicating with said plurality of sample and holds and configured to control the time of sampling of each one of said plurality of sample and holds.

8. The microscopic optical structure controller of claim 4 or claim 6, wherein the microelectromechanical optical device is a grating light valve and the microscopic optical structures are ribbons.

9. A driver for providing singular control of individual microscopic optical structures of a microelectromechanical optical device by individual pixel values generated by a pixel source for substantially simultaneous application to the individual microscopic optical structures, said driver comprising:

a) at least one multiplexing circuit communicating with the pixel source and configured to accept at least two of the pixel values from the pixel source and configured to multiplex the individual pixel values into a single stream of multiplexed individual pixel values; and

b) at least one interconnect coupled to said multiplexing circuit and configured to accept the single stream of multiplexed individual pixel values and communicate the single stream of multiplexed individual pixel values to the microelectromechanical optical device.

10. The driver of claim 9, wherein the microelectromechanical optical device is a grating light valve and the microscopic optical structures are ribbons.

11. A method for singularly controlling individual microscopic optical structures of a microelectromechanical optical device, comprising the step of sharing a single interconnect for independently communicating at least two individual pixel values to the individual microscopic optical structures of the microelectromechanical optical device where the individual pixel values are for substantially simultaneous application to the individual microscopic optical structures.

12. A method in accordance with claim 11, further comprising the step of substantially simultaneously applying the at least two individual pixel values to at least two corresponding microscopic optical structures according to a selected mapping of individual pixel values to individual microscopic optical structures.

13. A method in accordance with claim 12, further comprising the step of changing dynamically the mapping of individual pixel values to individual microscopic optical structures.

14. A method in accordance with claim 13, wherein said step of changing dynamically the mapping of individual pixel values to individual microscopic optical structures comprises varying the number of individual microscopic optical structures to

which each of the individual pixel values is applied to one, two, three, or four individual microscopic optical structures.

15. A method in accordance with claim 13, wherein said step of changing dynamically the mapping of individual pixel values to individual microscopic optical structures comprises varying the number of individual microscopic optical structures to which each of the individual pixel values is applied at a predefined interval.

16. A method in accordance with claim 15, wherein the predefined interval corresponds to a pixel time.

17. A method in accordance with claim 15, wherein the predefined interval corresponds to a sub-pixel time.

18. A method in accordance with claim 11, wherein the individual pixel value is an analog gray scale pixel voltage.

19. A method in accordance with claim 11, wherein the individual pixel value is a digital on-off pixel voltage.

20. A method in accordance with claim 11, wherein said step of sharing a single interconnect for communicating at least two individual pixel values to a microelectromechanical optical device comprises:

a) accepting the plurality of pixel values;

b) grouping at least one subset of the plurality of pixel values to form at least one group of pixel values;

c) multiplexing together the at least one group of pixel values to produce at least one multiplexed pixel stream;

d) converting the at least one multiplexed pixel stream to at least one multiplexed analog signal;

e) communicating the at least one multiplexed analog signal to the microelectromechanical optical device via the at least one interconnect;

f) demultiplexing the at least one multiplexed analog signal to produce a plurality of pixel voltages, whereby each of the plurality of pixel voltages corresponds to a particular one of the plurality of pixel values; and

g) applying each of the plurality of pixel voltages to the at least one individual microscopic optical structure.

21. A method in accordance with claim 20, wherein said step of multiplexing together the at least one group of pixel values to produce at least one multiplexed pixel stream comprises outputting each of the pixel values from the groups of pixel values sequentially in time so that each pixel value is output for a substantially equal predefined interval of time.

22. A method in accordance with claim 21, wherein said step of demultiplexing the multiplexed analog signal to produce a plurality of pixel voltages comprises:

a) sampling the multiplexed analog signal at a predefined time interval to extract a group of pixel voltages corresponding to said group of pixel values; and

b) holding said group of pixel values for a pixel time.

23. A method for singularly applying individual pixel values for substantially simultaneous application to individual microscopic optical structures of a microelectromechanical optical device, comprising the step of independently communicating at least two of the individual pixel values for substantially simultaneous application to individual microscopic optical structures of the microelectromechanical optical device via a single interconnect.

24. A method in accordance with claim 23, further comprising the step of distributing the individual pixel values to the corresponding individual microscopic optical structures.

25. A method in accordance with claim 24, further comprising the step of mapping the individual pixel values to one or more individual microscopic optical structures.

26. A method in accordance with claim 25, further comprising the step of varying the mapping of individual pixel values..

27. A method for singularly controlling individual microscopic optical structures of a microelectromechanical optical device with individual pixel values designated for substantially simultaneous application to the individual microscopic optical structures through a single interconnect, comprising the step of multiplexing a stream of at least two of the individual pixel values for simultaneous application to the individual microscopic optical structures to create a single multiplexed stream of pixel values for delivery to the microelectromechanical optical device via the single interconnect..

28. The method of claims 11, 23, or 27, wherein the microelectromechanical optical device is a grating light valve and the microscopic optical structures are ribbons.

29. A method for displaying an image with adjustable resolution by modulating a light beam with a microelectromechanical optical device, comprising the steps of:

a) sharing a single interconnect for communication of at least two individual pixel values to the microelectromechanical optical device;

b) mapping individual pixel values to at least one microscopic optical structure of the microelectromechanical optical device; and

c) varying said mapping whereby different display resolutions are provided.

30. A method for non-linear image mapping when modulating a light beam with a microelectromechanical optical device, comprising the steps of:

a) sharing a single interconnect for communication of at least two individual pixel values to the microelectromechanical optical device; and

b) mapping the individual pixel values to variable numbers of microscopic optical structures to create non-uniform pixel sizes that compensate for distortion of the image.

31. A method in accordance with claim 30, further comprising the step of adjusting said mapping over time to compensate for changing pixel size with time.